

## CLAIMS

1. An integrated circuit having a plurality of I/O modules comprising:
  - a bond pad formed on a substrate;
  - an electrostatic discharge device formed in the substrate, the
  - 5 electrostatic discharge device being at least partially formed beneath the bond pad;
  - an I/O buffer formed in the substrate and connected to the bond pad, the I/O buffer providing communication between the bond pad and circuitry formed in the substrate, wherein the circuitry is positioned substantially
  - 10 adjacent to both the electrostatic discharge device and the I/O buffer.
2. The integrated circuit of Claim 1 wherein the substrate is a silicon substrate.
3. The integrated circuit of Claim 1 wherein the I/O buffer is an output buffer.
4. The integrated circuit of Claim 1 wherein the I/O buffer is an input buffer.
5. The integrated circuit of Claim 1 wherein the I/O buffer is a complementary
- 15 output buffer.
6. The integrated circuit of Claim 1 wherein the circuitry is CMOS circuitry.
7. The integrated circuit of Claim 1 wherein the circuitry is BiCMOS circuitry.
8. The integrated circuit of Claim 1 wherein the circuitry is an application specific integrated circuit.
- 20 9. The integrated circuit of Claim 1 wherein the circuitry is digital signal processor.
10. The integrated circuit of Claim 1 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.

11. An integrated circuit comprising:
- a functional core formed on a substrate, the functional core being positioned centrally on the substrate; and
  - an I/O region positioned at the periphery of the functional core, the I/O region including a plurality of I/O modules, the I/O modules including:
    - a bond pad formed on a substrate;
    - an electrostatic discharge device; and
    - an I/O buffer wherein the I/O buffer is not positioned between the bond pad and the functional core.
12. The integrated circuit of Claim 11 wherein the substrate is a silicon substrate.
13. The integrated circuit of Claim 11 wherein the I/O buffer is an output buffer.
14. The integrated circuit of Claim 11 wherein the I/O buffer is an input buffer.
15. The integrated circuit of Claim 11 wherein the I/O buffer is a complementary output buffer.
16. The integrated circuit of Claim 11 wherein the functional core is CMOS circuitry.
17. The integrated circuit of Claim 11 wherein the functional core is BiCMOS circuitry.
18. The integrated circuit of Claim 11 wherein the functional core is an application specific integrated circuit.
19. The integrated circuit of Claim 11 wherein the functional core is digital signal processor.

20. The integrated circuit of Claim 11 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.
21. An integrated circuit comprising:
- a functional core formed on a substrate, the functional core including a plurality of integrated circuit elements and being positioned centrally on the substrate; and
  - an I/O region positioned at the periphery of the functional core, the I/O region including a plurality of I/O modules, the I/O modules including:
    - a bond pad formed on a substrate, the bond pad including a conductive surface for providing electrical connection to external devices;
    - an electrostatic discharge device formed beneath the bond pad;
    - and
    - a CMOS I/O buffer wherein the I/O buffer is not positioned between the bond pad and the functional core.
22. A method for forming an integrated circuit having a plurality of I/O modules comprising:
- forming a bond pad formed on a substrate;
  - forming an electrostatic discharge device formed in the substrate, the electrostatic discharge device being at least partially formed beneath the bond pad; and
  - forming an I/O buffer formed in the substrate and connected to the bond pad, the I/O buffer providing communication between the bond pad and circuitry formed in the substrate, wherein the circuitry is positioned

substantially adjacent to both the electrostatic discharge device and the I/O buffer.

23. The method of Claim 22 wherein the substrate is a silicon substrate.
24. The method of Claim 22 wherein the I/O buffer is an output buffer.
- 5 25. The method of Claim 22 wherein the I/O buffer is an input buffer.
26. The method of Claim 22 wherein the I/O buffer is a complementary output buffer.
27. The method of Claim 22 wherein the circuitry is CMOS circuitry.
28. The method of Claim 22 wherein the circuitry is BiCMOS circuitry.
- 10 29. The method of Claim 22 wherein the circuitry is an application specific integrated circuit.
30. The method of Claim 22 wherein the circuitry is digital signal processor.
31. The method of Claim 22 wherein the entire surface of the substrate beneath the bond pad is occupied by the electrostatic discharge device.
- 15 32. A method for forming an integrated circuit comprising:
  - providing a functional core formed on a substrate, the functional core being positioned centrally on the substrate; and
  - in an I/O region positioned at the periphery of the functional core, forming a plurality of I/O modules, the steps for forming the I/O modules
  - 20 including:
    - forming a bond pad formed on a substrate;
    - forming an electrostatic discharge device; and

forming an I/O buffer wherein the I/O buffer is not positioned  
between the bond pad and the functional core.

- 33. The method of Claim 32 wherein the substrate is a silicon substrate.
- 34. The method of Claim 32 wherein the I/O buffer is an output buffer.
- 5 35. The method of Claim 32 wherein the I/O buffer is an input buffer.
- 36. The method of Claim 32 wherein the I/O buffer is a complementary output  
buffer.
- 37. The method of Claim 32 wherein the functional core is CMOS circuitry.
- 38. The method of Claim 32 wherein the functional core is BiCMOS circuitry.
- 10 39. The method of Claim 32 wherein the functional core is an application specific  
integrated circuit.
- 40. The method of Claim 32 wherein the functional core is digital signal  
processor.
- 41. The method of Claim 32 wherein the entire surface of the substrate beneath  
15 the bond pad is occupied by the electrostatic discharge device.